

## **Patent Claims**

- 5        1. A procedure for consolidating and sealing a tube, particularly a metal tube intended for example for a cooling unit, whereby the tube is positioned between a sonotrode and an associated counter electrode, such as the anvil of a ultrasonic welding device, the sonotrode being activated and displaced relative to the counter electrode for consolidating and sealing the tube, characterized by the following process steps:
  - 10      - positioning the tube and fixing it between the sonotrode and counter electrode,
  - determining a characteristic variable of the tube with the tube being fixed between the sonotrode and counter electrode,
  - retrieving stored welding parameters on the basis of the characteristic variable and
  - activating the sonotrode and moving the sonotrode and counter electrode in relation to each other for consolidating and sealing the tube.
- 15        2. A procedure pursuant to claim 1,  
              characterized in  
              that the distance between the sonotrode and counter electrode with the tube fixed between them is determined as a characteristic variable.
- 20        3. A procedure pursuant to claim 1,  
              characterized in  
              that the electrical conductivity of the tube is determined as a characteristic variable.
- 25        4. A procedure pursuant to claim 1,  
              characterized in  
              that the wall thickness of the tube is determined as a characteristic variable.
- 30        5. A procedure pursuant to claim 1,  
              characterized in

that the deformation level of the tube is determined as a characteristic variable.

6. A procedure pursuant to claim 1,

characterized in

5 that for determining the deformation level, the pressure to be applied for displacing the sonotrode and counter electrode towards each other across a defined distance is measured.

7. A procedure pursuant to claim 1,

10 characterized in

that during the displacement of the sonotrode toward the counter electrode the sonotrode is preferably activated by means of ultrasound.

8. A procedure pursuant to claim 1,

15 characterized in

that the wall thickness is preferably determined by means of ultrasound.

9. A procedure pursuant to claim 1,

characterized in

20 that multiple characteristic variables are determined and, based on them, stored welding parameters are retrieved.

10. A procedure pursuant to claim 1,

characterized in

25 that following the consolidation and sealing of the tube, one of its sections is cut such as sheared off.

11. A procedure pursuant to at least one of the above claims,

characterized in

30 that for determining welding parameters to be stored, one or more controls curves taking into consideration the temporal change of energy, force and/or power of the

sonotrode subjected to ultrasonic vibration are recorded during the determination of characteristic variables, such as the diameter and/or wall thickness of standard tubes to be consolidated and sealed, in that control curves are compared to actual curves of tubes with unknown diameter and/or unknown wall thickness to be consolidated and sealed, and in that, while taking into consideration potentially defined tolerances in the event of an agreement with a control curve, the welding parameters associated with this curve are used for consolidating and welding the tubes.

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12. A procedure pursuant to at least claim 11,

characterized in

that the actual curve is compared to the control curve expanded by a tolerance range.

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13. A procedure pursuant to at least claim 11,

characterized in

that the control curves are associated with welding parameters such as pressure, welding duration and/or energy input, which are determined for consolidating and welding standard tubes used during the recordation of control curves, in that an actual curve is recorded for welding a tube with unknown size and, in that, the actual curve is fitted into one of several control curves and thus, the tube with unknown size is consolidated and welded on the basis of the welding parameters associated with the corresponding control curve.

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